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North Marion School District Population and Enrollment Forecasts, 2007-08 to 2016-17

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**NORTH MARION SCHOOL DISTRICT
POPULATION AND ENROLLMENT FORECASTS
2007-08 TO 2016-17**

**Prepared By
Population Research Center
Portland State University**

FEBRUARY, 2007

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North Marion School District, UPDATED* Enrollment Forecasts, 2008-09 to 2016-17

Actual			Forecast								
Grade	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
K	157	133	140	152	147	146	148	148	152	158	164
1	115	164	146	151	161	158	159	162	162	169	175
2	152	115	167	149	151	163	162	163	166	169	176
3	160	151	117	170	149	153	167	166	167	171	175
4	163	161	154	119	170	151	158	172	171	174	179
5	141	166	164	157	119	172	155	163	177	178	181
6	145	141	168	166	157	120	176	158	167	183	184
7	154	145	142	169	166	158	121	177	159	169	185
8	156	154	144	141	167	164	156	120	175	157	167
9	160	152	161	150	147	174	171	162	125	182	163
10	156	160	148	157	145	143	170	167	158	122	178
11	136	161	157	146	154	143	141	168	165	157	121
12	145	140	150	147	137	144	133	131	156	153	145
Total	1,940	1,943	1,958	1,974	1,970	1,989	2,017	2,057	2,100	2,142	2,193
K-2	424	412	453	452	459	467	469	473	480	496	515
3-5	464	478	435	446	438	476	480	501	515	523	535
6-8	455	440	454	476	490	442	453	455	501	509	536
9-12	597	613	616	600	583	604	615	628	604	614	607

	5 Year Growth: 2006-07 to 2011-12		5 Year Growth: 2011-12 to 2016-17		10 Year Growth: 2006-07 to 2016-17	
	Change	Pct.	Change	Pct.	Change	Pct.
K-2	43	9%	48	10%	91	21%
3-5	12	3%	59	12%	71	15%
6-8	-13	-3%	94	21%	81	18%
9-12	7	1%	3	0%	10	2%
Total	49	3%	204	10%	253	13%

**This update was produced by adding the actual Fall 2007 enrollment to the forecast model used in the February 2007 demographic study, and making minor adjustments. Major elements of the February 2007 forecasts, including future migration assumptions, are unchanged.*

Population Research Center, Portland State University, November 2007

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EXECUTIVE SUMMARY

After a period of slow growth in the late 1990s, total enrollment in the North Marion School District (NMSD) has grown by an average of 2.5 percent annually over the most recent six years from 2000-01 to 2006-07. During the period, all schools have added enrollment, and the K-12 total has increased by 270 students, from 1,670 to 1,940.

This report presents the results of a forecast conducted by the Portland State University Population Research Center (PRC) indicating that overall NMSD enrollment will continue to increase during the next 10 years, with the greatest initial (five year) growth in primary and elementary grades, subsequent growth in middle school, and relatively slow growth in high school within the 10 year forecast horizon.

PRC's methodology links enrollment trends with the area's population dynamics. Employment and population growth are expected to continue in the northern Willamette Valley region including the Portland and Salem metropolitan areas, so demand for housing will likely remain strong. The supply of land for housing within the NMSD is limited by the area's predominant agricultural role, and the recent level of residential subdivision development is unlikely to continue in the short run, given current zoning and Urban Growth Boundaries. In the long run, however, given the District's current small population, incremental additions of land for residential development could accommodate growth approaching or attaining current levels.

Population in the District is forecast to grow by an average of 1.6 percent annually between 2000 and 2020, slightly higher than the 1.3 percent annual growth rate forecast in the State of Oregon Office of Economic Analysis' most recent long-range forecast for Marion County.¹ Population estimates for 2006 indicate that about 1,000 residents have already been added in the District's three cities since the 2000 Census; the 20 year

¹County growth rate for 2000-2020 from "Forecasts of Oregon's County Populations and Components of Change, 2000 to 2040." Oregon Department of Administrative Services, Office of Economic Analysis, April, 2004.

forecast that we characterize as the most likely scenario predicts population growth of about 3,300 persons for the District overall, from about 8,600 in 2000 to 11,900 in 2020.

This study also presents estimates of the number of students generated from new housing development. About 200 students reside in homes built within the past six years, accounting for most of the District's 270 student growth. Detailed information about the average number of NMSD students per home is presented in the "Housing Development and Student Generation" section of this report.

The population and enrollment forecasts are based on the assumptions that:

- current residential development within the NMSD will continue to contribute to enrollment growth in the 2007-08 and 2008-09 school years and increase the number of young families and future births,
- a period of slower migration will occur between 2008 and 2011 as new housing development stalls due to the limited supply of residential land,
- after 2011 housing development resumes due to one or more of the following: municipal boundary expansion, multi-family infill, or development of some of the 25 or more Measure 37 claims that have been filed with Marion County,
- fertility rates remain at recent levels, and
- families with children continue to comprise a large share of the migration flow into the NMSD.

Table 1 contains recent historical and forecast enrollments for the District's grade level groups in five year intervals. Following the table is a brief summary of the forecasts.

Table 1
Historic and Forecast Enrollment
North Marion School District

	Actual			Forecast	
	1996-97	2001-06	2006-07	2011-12	2016-17
K-2	406	386	424	487	530
<i>5 year growth</i>		-20	38	63	43
3-5	394	396	464	496	550
<i>5 year growth</i>		2	68	32	54
6-8	408	433	455	470	550
<i>5 year growth</i>		25	22	15	80
9-12	411	532	597	616	634
<i>5 year growth</i>		121	65	19	18
Total	1,619	1,747	1,940	2,069	2,264
<i>5 year growth</i>		128	193	129	195

District-wide Enrollment Forecast

- Total K-12 enrollment is expected to grow by over 300 students in the next ten years.
- The average annual K-12 growth forecast is 1.3 percent between 2006-07 and 2011-12, and 1.8 percent between 2011-12 and 2016-17.
- About half of the growth in the next five years will be in primary grades (K-2); they add about 100 students over the 10 year period.
- Elementary grades (3-5) add nearly 90 students in the 10 year forecast.
- Middle school (6-8) enrollment is forecast to grow very little in the next five years, then increase faster than other school levels after 2011-12.
- High school (9-12) enrollment is currently near a peak, and is expected to grow relatively slowly throughout the forecast, as migration contributes fewer teenagers than younger children to the District's population.

INTRODUCTION

In Fall 2006, the North Marion School District (NMSD) requested that the Portland State University Population Research Center (PRC) prepare enrollment forecasts for use in the District's long-range planning. This study integrates information about NMSD enrollment trends with local area population, housing, and economic trends, and includes a population forecast for the District as well as forecasts of district-wide enrollment by grade level for the period between 2007-08 and 2016-17. Information sources include the U.S. Census Bureau, birth data from the Oregon Center for Health Statistics, county population forecasts from the Oregon Office of Economic Analysis, employment trends and forecasts from the Oregon Employment Department, and personal interviews with city and regional officials and developers.

The District serves the incorporated Marion County cities of Aurora, Donald, and Hubbard, surrounding agricultural land, and several small residential enclaves including the historic Butteville settlement.

Following this introduction are sections presenting recent population, housing, and enrollment trends within the District. Another section is devoted to our research on the average number of NMSD students generated from new (built since 2000) and existing (prior to 2000) housing by jurisdiction within the NMSD. Next are the results of the district-wide population and enrollment forecasts and a description of the forecast methodology. The conclusion contains a brief discussion of the nature and accuracy of forecasts, and an appendix presents alternate low and high forecast scenarios.

We would like to acknowledge (in alphabetical order) the help of the following individuals who contributed to the study by answering questions, providing local insight, or providing data:

- Laurie Boyce, City of Aurora
- Mark Fancey, MWVCOG
- Janet Lane, City of Donald
- Linda Murray, NMSD
- Vickie Nogle, City of Hubbard
- Jan Vlcek, City of Aurora
- Daniel Webb, Associated Properties

POPULATION AND HOUSING TRENDS, 1990 to 2006

During the decade between 1990 and 2000, total population within the NMSD grew by seven percent, from 8,033 persons to 8,602. Marion County grew by 25 percent overall, and the nearby Portland metropolitan area grew by 27 percent. Although the area served by the NMSD grew at a slower rate than the Portland and Salem areas, the population living within the District's three incorporated cities grew by 36 percent, adding about 1,000 residents in the decade.² As a result of the growth in the cities and population loss in unincorporated areas, the share of the District's population living within the three cities grew from 34 percent in 1990 to 44 percent in 2000. Since 2000 the cities have added an additional 1,000 residents, growing at an even faster rate than in the 1990s, and again outpacing the growth of the Portland and Salem areas. Table 2 shows the 1990 and 2000 census counts and 2006 population estimates for the three cities and the metro areas.

Table 2
City and Metro Area Population, 1990, 2000, and 2006

	1990	2000	2006	Avg. Annual Growth Rate	
				1990-2000	2000-2006
City of Aurora ¹	567	655	920	1.4%	5.4%
City of Donald	316	625	895	6.8%	5.7%
City of Hubbard	1,881	2,483	2,960	2.8%	2.8%
NMSD City Total	2,764	3,763	4,775	3.1%	3.8%
NMSD Total	8,033	8,602	N/A	0.7%	
Salem MSA ²	278,024	347,214	373,335	2.2%	1.2%
Portland-Vancouver-Beaverton MSA ³	1,523,741	1,927,881	2,121,910	2.4%	1.5%

1. A portion of the City of Aurora's population growth is attributable to the annexation of 47 persons between 1990 and 2000 and 28 persons between 2000 and 2006.

2. Salem MSA consists of Marion and Polk Counties.

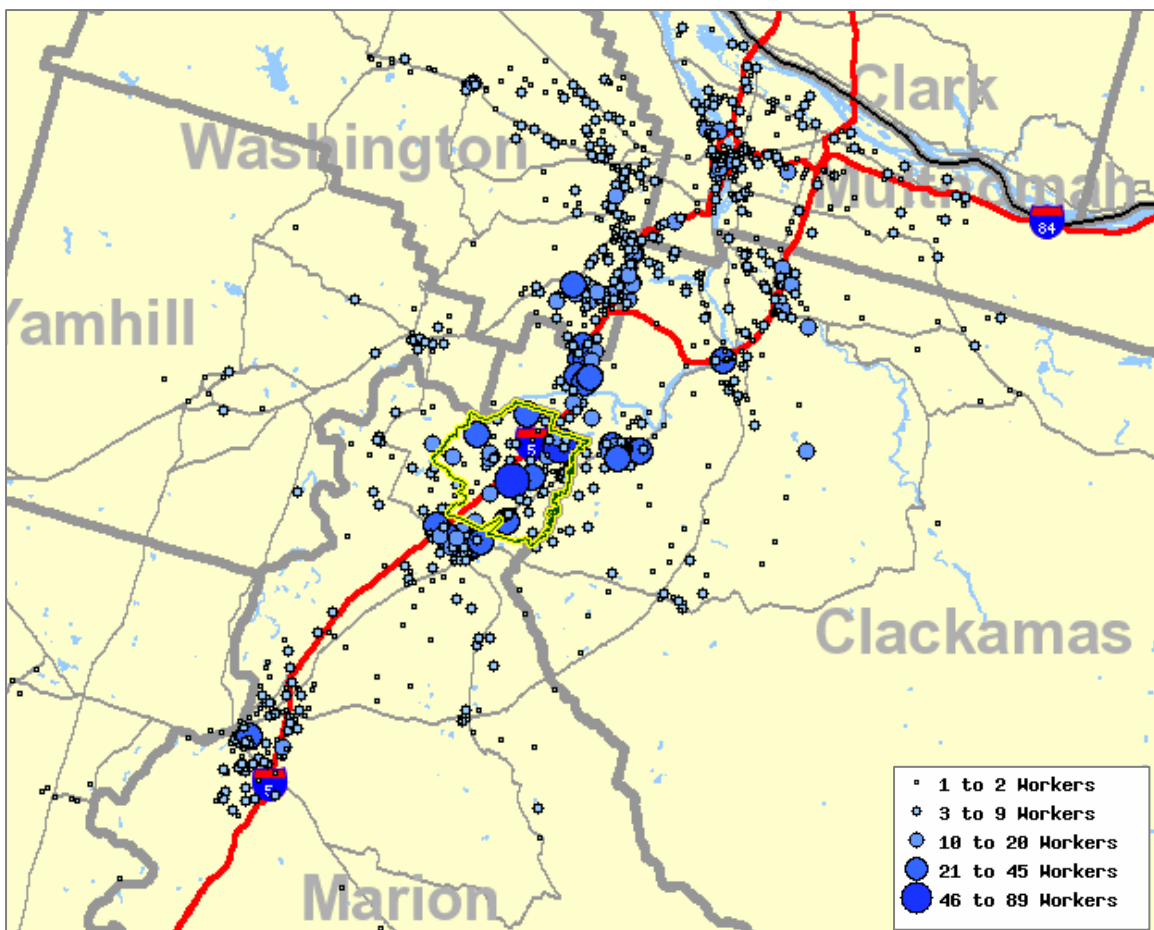
3. Portland-Vancouver MSA consists of Clackamas, Columbia, Multnomah, Washington, Yamhill (OR) and Clark and Skamania (WA) Counties.

Sources: U.S. Census Bureau, 1990 and 2000 censuses; Portland State University Population Research Center, 2006 estimates.

²Aurora added 47 persons between 1990 and 2000 due to annexation. Growth in Donald and Hubbard was not influenced by boundary changes.

Although the NMSD is composed of rural areas and small communities, much of the population growth in the area is attributable to its proximity to the Portland metropolitan area's large job market. The 2000 Census revealed that about 59 percent of the area's employed residents worked outside of Marion County, and only 11 percent of Aurora, Donald, and Hubbard residents worked in the same city in which they lived.³ The dots on Map 1 below indicate the places of work in 2003 for area residents.⁴ Although place names are not included on Map 1, readers familiar with the region's highway system and other features will recognize the largest employment clusters outside of the District as the

Map 1
Place of Work of NMSD Area Residents, 2003



³U.S. Census Bureau, 2000 Census data for Marion County census tract 102, which has boundaries that approximate the NMSD. Summary File 3, Tables P26 and P27.

⁴U.S. Census Bureau, LED Origin-Destination Database (2nd quarter 2003). Commute shed report for residents of census tract 102. Created on line at <http://lehd.dsd.census.gov/led/datatools/onthemap.html>.

nearby employment centers within the shortest commuting distances — Wilsonville, Woodburn, Canby, and Tualatin. Somewhat farther, Central Portland, Central Salem, Beaverton/Tigard, and the Clackamas Town Center area are also notable workplace destinations for NMSD area residents. In general, more workers head north into the Portland metropolitan area than south to Woodburn and Salem. The lower cost of housing and the appeal of a small town environment have made North Marion communities an attractive residential choice for many workers, particularly those in the growing job centers within a 15 minute drive of the area.

Population by Age Group

Population by age group for 1990 and 2000 is shown in Table 3 on the next page. In 2000, 21.4 percent of the District's population was of school age (5 to 17). The NMSD's share of population age 5 to 17 was higher than Marion County's 19.7 percent and the Portland metropolitan area's 18.4 percent shares. School-age population grew by 17 percent in the 1990s, a much faster rate than the seven percent increase for overall population. The largest growth rate for any group under age 40 was among children age 10 to 14 (25 percent). Declines in the 20 to 34 and 65 to 69 age groups between 1990 and 2000 have some precedent in state and national demographic trends, as those age groups in 2000 related to smaller birth cohorts. Persons age 20 to 34 in 2000 were born during the late 1960s and 1970s "baby bust" that followed the "baby boom." Those age 65 to 69 were born during the depression era of the early 1930s, when births also fell from previous levels.

Table 3
Population by Age Group
North Marion School District, 1990 and 2000

	1990	2000	1990 to 2000 Change	
			Number	Percent
Under Age 5	610	585	-25	-4%
Age 5 to 9	635	681	46	7%
Age 10 to 14	584	730	146	25%
Age 15 to 17	362	434	72	20%
Age 18 to 19	184	227	43	23%
Age 20 to 24	499	434	-65	-13%
Age 25 to 29	587	545	-42	-7%
Age 30 to 34	655	574	-81	-12%
Age 35 to 39	614	663	49	8%
Age 40 to 44	568	711	143	25%
Age 45 to 49	511	642	131	26%
Age 50 to 54	452	603	151	33%
Age 55 to 59	378	477	99	26%
Age 60 to 64	360	358	-2	-1%
Age 65 to 69	342	298	-44	-13%
Age 70 to 74	295	243	-52	-18%
Age 75 to 79	196	196	0	0%
Age 80 to 84	124	121	-3	-2%
Age 85 and over	77	80	3	4%
Total Population	8,033	8,602	569	7%
Total age 5 to 17	1,581	1,845	264	17%
share age 5 to 17	19.7%	21.4%		

Source: U.S. Census Bureau, 1990 and 2000 Censuses; data aggregated to NMSD boundary by Portland State University Population Research Center.

Chart 1
2000 Census Population by Single Year of Age
North Marion School District

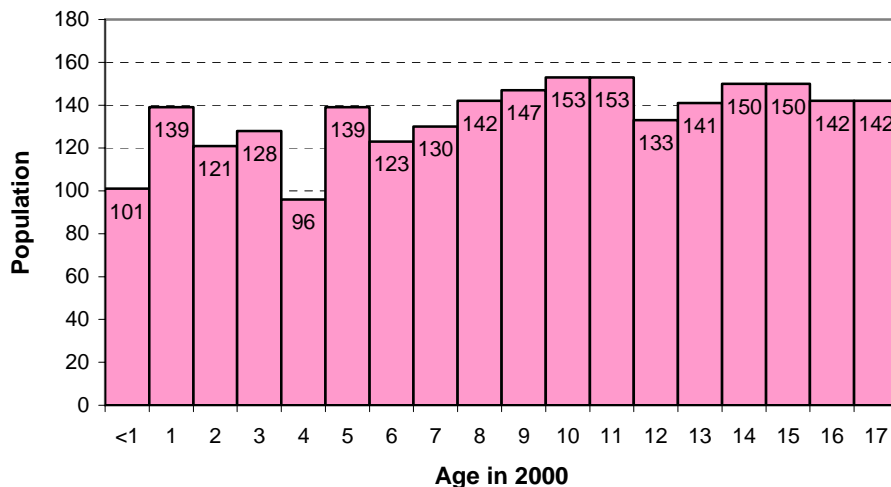


Chart 1 on the previous page provides even more age detail for the child population within the NMSD in 2000. For individual years of age, some of the highest counts were between the ages of 10 to 15, and the smallest counts were generally under age 5. However, Chart 1 also illustrates that in a population as small as the NMSD's, large variations in population can occur between single years of age.

Births and Fertility Rates

The number of births each year to women living in the NMSD has fluctuated throughout the 1990s and 2000s, but has increased in each of the past few years. Table 4 reports the number of births in the District annually from 1989 to 2005. The annual average of 124 births between 2000 and 2002 was lower than the 1990 to 1992 average of 146 births per year, a trend that was consistent with the lower population of women in prime childbearing ages 20 to 34 in 2000. The 1996 to 1998 period was an outlier, with an annual average of 169 births per year. Since 2002, births have increased, partly due to

Table 4
Annual Births, 1989 to 2005
North Marion School District

Year	Births
1989	124
1990	149
1991	148
1992	142
1993	121
1994	149
1995	128
1996	171
1997	166
1998	171
1999	132
2000	136
2001	127
2002	110
2003	138
2004	145
2005	165

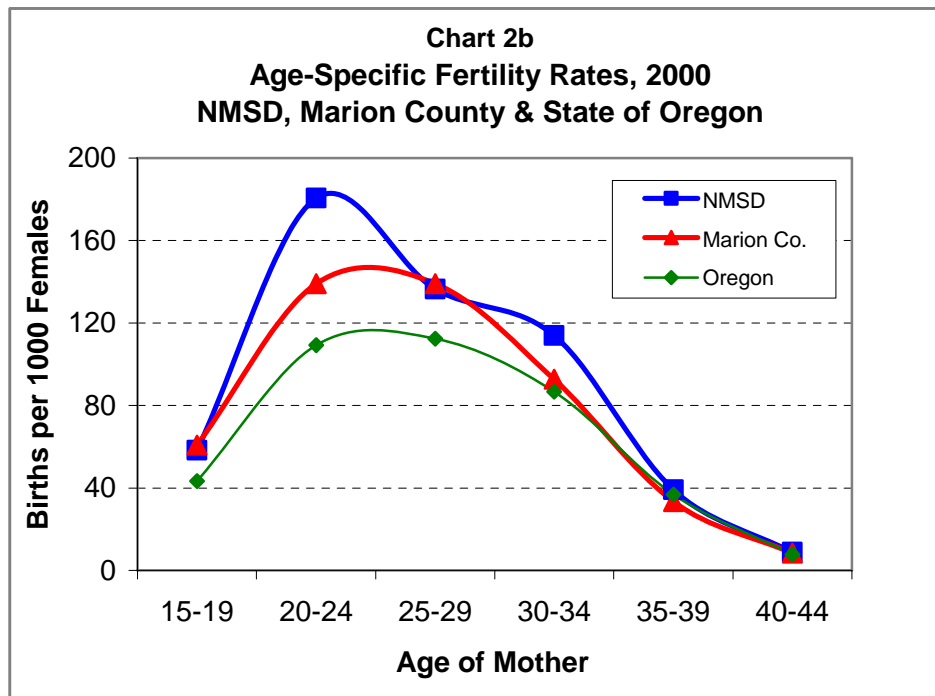
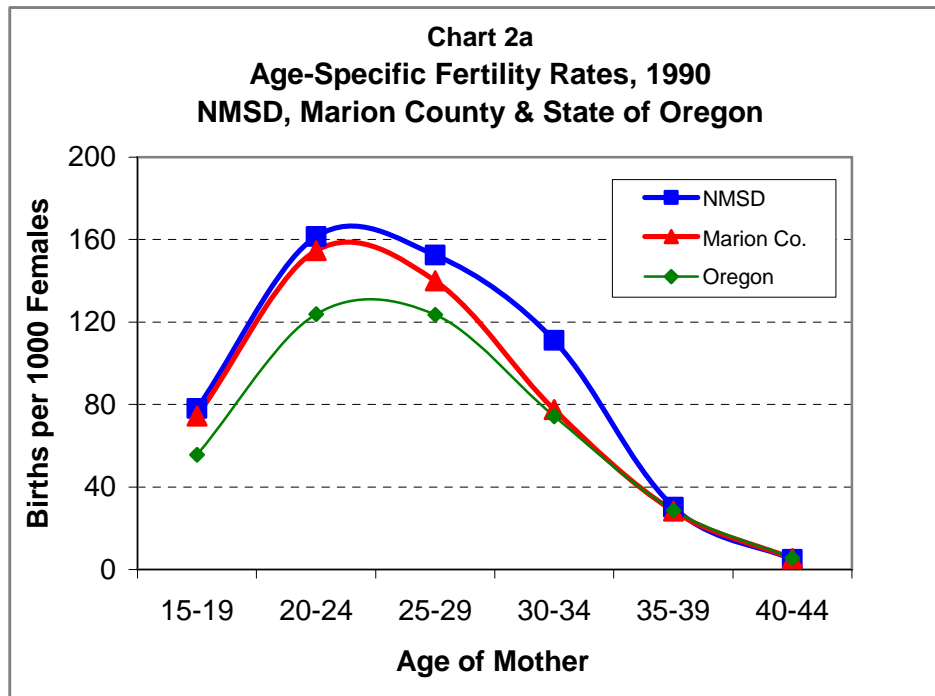
Source: PSU-PRC estimates using Oregon Center for Health Statistics zip code data, including published totals for zips 97002, 97020, and 97032, and a small portion of 97071 allocated using geocoded records of individual births.

the area's overall population growth. The most recent estimate of 165 births in 2005 is 50 percent higher than the low of 110 births in 2002.

Fertility rates for the NMSD in 1990 and 2000 are shown in Charts 2a and 2b on the next page. For comparison, Marion County and State of Oregon fertility rates are also included. The District's rates were calculated for each age group by dividing the average annual number of births in the three year period around each census (1989 to 1991 and 1999 to 2001) by the female population counted in the census. For example, there were an average of 36 births per year to mothers age 20 to 24 in 1989 to 1991 and a population of 223 women age 20 to 24 counted in the 1990 Census. So the fertility rate in 1990 for women age 20 to 24 was $36/223 = 0.161$ births per female, or 161 per thousand. Charts 2a and 2b show that fertility rates within the NMSD were similar to or higher than comparable rates for Marion County and the State of Oregon in both 1990 and 2000.

Another common measure of fertility is the Total Fertility Rate (TFR). This is an estimate of the number of children that would be born to the average woman during her childbearing years, based on age-specific fertility rates observed at a given time. The 2000 TFR for the District was 2.69, identical to the 1990 rate. The NMSD TFRs were considerably higher than those in Marion County (2.40 in 1990 and 2.37 in 2000) and the State (2.05 in 1990 and 1.98 in 2000) overall.

Common trends throughout the State between 1990 and 2000 were declining fertility rates for women under age 30 and increases for women age 30 and over, declining fertility rates for both Hispanic and non-Hispanic females, and an increasing share of total births among Hispanics, due to the population growth of young Hispanic adults and population decline among young non-Hispanic adults influenced by the U.S. "baby bust" of the 1970s. These age and ethnic-specific trends offset each other, resulting in relatively stable TFRs. The population of the NMSD is too small to be sure about changes in fertility rates by age and ethnicity, but some of the statewide trends are likely at work here too. Unlike many other parts of Oregon, the NMSD already had a significant Hispanic population by 1990, and the average annual number of births to Hispanic mothers increased modestly from 30 in 1990 to 41 in 2000, even as the population of Hispanic females of child-bearing age nearly doubled.



Housing Growth

During the 1990s, the number of housing units within the District's boundaries increased by 248 (eight percent), as shown in Table 5 below. The number of households (occupied housing units) increased by only five percent. The growth rate for the number of households with children under 18 (nine percent) outpaced both housing unit and household growth. Expressed in net change, 95 of the additional 131 households had children under 18. The share of households in the NMSD that included at least one child under the age of 18 increased from 37 percent in 1990 to 39 percent in 2000. The average number of persons per household also increased, from 2.75 in 1990 to 2.85 in 2000.

Table 5
North Marion School District
Housing and Household Characteristics, 1990 and 2000

	1990	2000	1990 to 2000 Change	
			Number	Percent
Housing Units	2,975	3,223	248	8%
Single Family <i>share of total</i>	1,678 56%	1,793 56%	115	7%
Multiple Family <i>share of total</i>	147 5%	199 6%	52	35%
Mobile Home and Other <i>share of total</i>	1,150 39%	1,231 38%	81	7%
Households	2,874	3,005	131	5%
Households with children under 18 <i>share of total</i>	1,069 37%	1,164 39%	95	9%
Households with no children under 18 <i>share of total</i>	1,805 63%	1,841 61%	36	2%
Household Population	7,901	8,571	670	8%
Persons per Household	2.75	2.85	0.10	4%

Source: U.S. Census Bureau, 1990 and 2000 Censuses; data aggregated to NMSD boundary by Portland State University Population Research Center.

Beginning in 2002, the pace of residential development within the District accelerated. Nearly all of the recent housing growth has occurred within new subdivisions in the three incorporated places. Table 6 lists the major housing developments in each of the cities. Nearly 500 residential lots have been added in these 15 subdivisions, and development is essentially complete in the first 11 subdivisions. The remaining four are currently under construction. In the largest of the four, Hubbard's West Meadow Estates, just over half of the 74 homes had been sold and occupied by December 2006, and the developer expects construction and occupancy of the remaining homes to be complete by late 2007 or early 2008. In Aurora, infrastructure is being installed in Keil Park No. 2, with home sales expected to commence in summer, 2007.

Table 6
New Residential Subdivisions¹
North Marion School District, 2000 to 2007

Jurisdiction	Subdivision Name	Homes Built²	Lots³
City of Aurora	Strawberry Meadows	2003-2004	13
	Orchard View	2003-2004	43
	Hazelnut Park	2005-2006	11
	Keil Park	2005-2006	40
	Keil Park No. 2	2007-2008	39
City of Donald	Brentwood Meadows	2003-2005	19
	Clearbrook Estates	2003-2005	11
	Chiara Terrace	2003-2004	37
	Chiara Terrace No. 2	2005-2006	41
	Brentwood Terrace	2006-2007	22
City of Hubbard	Walnut Vale	2000-2002	17
	Andrew Commons	2002-2003	54
	Mill Creek Farm	2003-2004	41
	West Meadow Estates	2005-2007	74
	Mineral Springs Park	2006-2007	21

1. Subdivisions with 10 or more new homes planned, under construction, or built since 2000.

2. The year(s) in which the majority of homes were built, according to tax assessor records and additional information from city officials and developers.

3. Hybrid source of tax assessor's records, city officials, and developers. There are sometimes small differences of one or two lots between the various sources.

Information from tax assessor records is also helpful in chronicling historic housing growth within the District. We acquired GIS shape files (digital boundaries to import into mapping software) from Marion County through a data sharing agreement with the county's Information Technology department. The geographic data includes school district boundaries, city boundaries, comprehensive plan areas, urban growth boundaries, and tax lots. We used tax lot attribute data to estimate the number of housing units by year built, and summarized the information by jurisdiction in Table 7. The table shows that the number of housing units built within the NMSD since 2000 has already exceeded the number built in the 1990s. In fact, the 344 units built in the four year period between 2002 and 2005 is about the same as the 10 year total for the 1990s.

Table 7
North Marion School District
Homes Built 1990 to 2005 by Jurisdiction¹

Jurisdiction	1990-99 Total	Year Built						2000-05 Total
		2000	2001	2002	2003	2004	2005	
Aurora	49	1	2	7	26	28	38	102
Donald	52	2	1	0	20	29	51	103
Hubbard	123	7	8	52	31	35	1	134
Unincorporated Area								
Rural Subdivisions ²	52	3	5	3	7	2	0	20
Other Unincorporated ³	65	1	3	3	2	4	5	18
District Total	341	14	19	65	86	98	95	377

1. Does not include manufactured homes in parks.

2. New homes on land designated in Marion County comprehensive plan as "Rural Residential."

3. New homes on all other land; most are designated as "Primary Agriculture."

Source: Data compiled by PSU-PRC, using geographic shape files and attribute data from Marion County, Dept. of Information Technology, GIS Division, November 2006. Housing unit counts were determined by PSU-PRC using the "property class" and "stat class" fields in the tax lot attribute data.

The 341 units built between 1990 and 1999 exceeds the change in housing stock between the 1990 and 2000 censuses by about 90 units. There is never an exact match between housing counts derived from tax assessor's data and census housing counts, and the census comparison represents *net* housing change, since some old homes are removed for new development, and some new homes merely replace existing homes on the same lot. Given these considerations, the census and tax assessor's data are fairly consistent measures of housing growth. Among the units built in the 1990s, 117 (34 percent) were

built outside of the District's incorporated cities. That has changed in the 2000s, with only 38 units (10 percent) of housing growth occurring on unincorporated land.

Comparing the number of homes completed through the end of 2005 with the subdivision list, there is the potential for about 140 more homes to be built within the subdivisions. About half of these were completed in 2006 and most of the remainder are likely to be completed in 2007. Adding a handful of infill homes and homes in the unincorporated area, the 2006 and 2007 District totals should be similar to the annual 2002 to 2005 housing growth shown in Table 7. In the City of Hubbard's 2006 Budget Message, Budget Officer Rob Daykin anticipated "the equivalent of sixty single-family residential structures being constructed" in Hubbard in FY 2006-07.⁵

After housing construction is completed in the currently approved subdivisions listed in Table 6, there will likely be a few years with slower housing growth, even if demand for housing continues. That is because all three of the cities have land use constraints that will slow the approval of additional subdivisions. The City of Aurora has about 96 acres in its Urban Growth Boundary (UGB) that is outside of its city boundaries, but in November 2006 voters overwhelmingly passed a measure amending the city charter to require a citywide vote on future annexation approvals. The effect of that measure on the timing and extent of Aurora's growth is uncertain. The City of Donald has UGB boundaries coterminous with its city boundaries, and there is no room for new subdivisions. City Manager Janet Lane estimates that the maximum number of additional homes that could be built within Donald's current boundaries is 34. The City of Hubbard only has about 14 acres of privately owned land within its UGB that is outside of its city boundaries. Within Hubbard, there is also no room for new subdivisions. State law requires cities to provide a 20-year supply of land within their urban growth boundary for residential, commercial and industrial uses, so planning efforts are currently underway to assess Hubbard's current buildable land inventory, future growth potential, and possible need for UGB expansion. Mark Fancey of the Mid-Willamette Valley COG is assisting Hubbard with the planning effort, and an early result of the study is a draft population

⁵City of Hubbard Annual Operating Budget, FY 2006-07, available at <http://www.cityofhubbard.org/documents/CityofHubbardAnnualOperatingBudget20062007.pdf>.

forecast of 3,619 for Hubbard in 2015, assuming about 2.3 percent average annual growth between 2005 and 2015. The forecast, subject to approval by the Marion County Board of Commissioners, would replace the previous Hubbard forecast of 3,105 for 2020 that is included in the Marion County Comprehensive Plan. Hubbard's latest estimated population of 2,960 in 2006 is quickly approaching the previous 2020 forecast.

If UGB expansions occur in any of the NMSD's cities, it may take at least three to five years between boundary expansion and housing occupancy, given the process required to annex land, plan development, plat and approve new subdivisions, build infrastructure, and build and market homes.

Since the housing supply within the NMSD is limited, and the area's growth is fueled by the large job markets in the Portland and Salem areas, the experience of the past few years encourages us to assume that household growth is largely a function of supply. That is, the demand will continue to be sufficient for the limited number of new homes built each year. But if there is a major economic slowdown causing regional demand for housing to drop severely, housing sales may slow within the District. Supply is also subject to fluctuate if the cost of raw materials and land continues to rise and housing prices stagnate. In this scenario it might not be profitable for property owners to develop their land, or they may prefer to wait for a more favorable development environment. The impact of future housing development on school enrollment will depend on the number of new homes and the share of those homes that are occupied by families with children. The section of this report titled "Housing Development and Student Generation" presents data on the average number of NMSD students in the District's existing housing units, helping readers to quantify the actual relationship between housing and school enrollment.

ENROLLMENT TRENDS

In the past 10 years, total K-12 enrollment in the North Marion School District has increased by 20 percent (321 students), with annual K-12 enrollment gains in every year except 2000-01. Table 8 on the next page summarizes the enrollment history for the District by grade level annually from 1996-97 to 2006-07. Over the 10 year period, each of the four schools has grown, but the chronological pattern of growth in the lower grades was very different from that in the upper grades. High school enrollment increased each year until 2004-05, but has leveled off since. Middle school (grades 6-8) enrollment has grown slowly, with enrollment increases in six of the 10 years. Elementary (grades 3-5) enrollment was relatively stable for most of the period, until experiencing large increases in the last two years. Primary (grades K-2) enrollment fell until 2000-01, and then increased steadily through 2005-06.

Some of the year-to-year fluctuation in enrollment by grade level results from annual fluctuation in births and the size of individual age cohorts related to the District's relatively small population, as described in the previous section. For example, the largest class in 2005-06 was 2nd grade, so when they entered 3rd grade in 2006-07, enrollment at the K-2 level fell slightly and the 3-5 level gained. But there are broader demographic trends at work that explain the general trends in growth by grade level. In the late 1990s, the District's modest K-12 growth was almost entirely due to the changing age structure of the population. Beginning with the 2001-02 school year, population growth due to net migration became the largest contributor of enrollment growth.

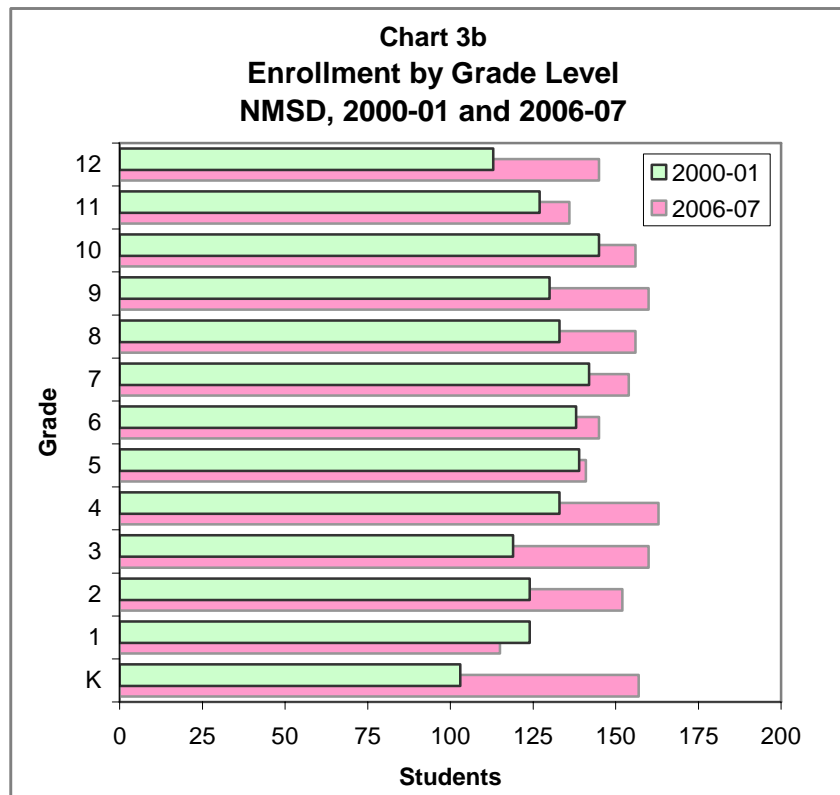
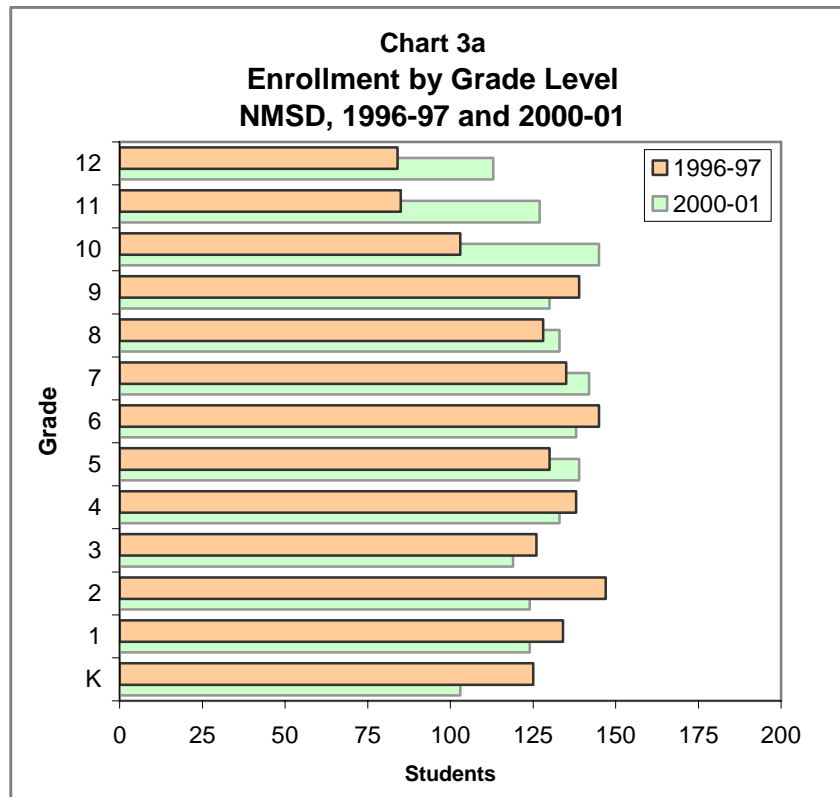
These trends are illustrated by the bar charts following Table 8, comparing enrollment by grade level in two discrete intervals since 1996-97. Chart 3a shows that grades 10, 11, and 12 had the smallest class sizes in 1996-97. These grades averaged 45 students fewer than the grade K-2 average. For the next several years more students entered the primary grades than exited the high school grades, causing K-12 enrollment to grow even as the

Table 8
North Marion School District, Historic Enrollment, 1996-97 to 2006-07

Grade	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
K	125	131	108	123	103	134	129	134	118	114	157
1	134	143	142	120	124	116	132	138	162	150	115
2	147	142	135	133	124	136	133	127	146	169	152
3	126	145	132	145	119	130	137	132	138	158	160
4	138	137	141	145	133	128	115	141	131	143	163
5	130	125	141	137	139	138	143	132	142	144	141
6	145	130	131	147	138	146	145	144	139	145	145
7	135	140	125	139	142	136	147	156	154	145	154
8	128	122	149	133	133	151	130	144	155	151	156
9	139	130	136	150	130	140	152	151	156	158	160
10	103	130	130	131	145	138	140	150	151	144	156
11	85	100	119	108	127	133	137	139	152	154	136
12	84	77	90	97	113	121	130	124	134	137	145
Total	1,619	1,652	1,679	1,708	1,670	1,747	1,770	1,812	1,878	1,912	1,940
K-2	406	416	385	376	351	386	394	399	426	433	424
3-5	394	407	414	427	391	396	395	405	411	445	464
6-8	408	392	405	419	413	433	422	444	448	441	455
9-12	411	437	475	486	515	532	559	564	593	593	597

	5 Year Growth: 1996-97 to 2001-02		5 Year Growth: 2001-02 to 2006-07		10 Year Growth: 1996-97 to 2006-07	
	Change	Pct.	Change	Pct.	Change	Pct.
K-2	-20	-5%	38	10%	18	4%
3-5	2	0%	68	17%	70	18%
6-8	25	6%	22	5%	47	12%
9-12	121	25%	65	12%	186	45%
Total	128	8%	193	11%	321	20%

Source: North Marion School District.



overall population in the District was relatively stable. At the same time, children “aged” into the upper grades, resulting in a more even grade distribution. Comparing 2000-01 enrollment with the 1996-97 base, Chart 3a shows that grades 10-12 grew significantly, while grades K-4 all lost enrollment.

If the District’s population had remained stable after 2000, K-12 enrollment might have begun a slow decline, since there were slightly more children in high school grades than in primary grades in 2000-01. Instead, net migration of families with children into the NMSD fueled enrollment growth at all grade levels, with the largest 2000-01 to 2006-07 enrollment increases in grades K-4, as shown in Chart 3b.

Another way to document the District’s growth due to net migration is to calculate grade progression rates (GPRs). The GPR is the ratio of enrollment in a specific grade to the enrollment in the preceding grade in the previous year. For example, the number of students enrolled in second grade this year divided by the number of students enrolled in first grade last year. Rates for some grades may be consistently high, indicating that new students are entering the District from private schools. For this reason, it is common to see higher GPRs for the kindergarten to 1st and the 8th to 9th grade transitions. After grade 9, low GPRs can indicate that students are leaving school before graduation. But for most elementary grades, if the population entering and leaving the District is in balance and students are not being retained at particular grades for academic reasons, one can expect GPRs very close to 1.00. Rates above 1.00 in the elementary grades usually indicate net migration into the District, while rates below 1.00 indicate net out-migration.

Table 9 compares the average GPRs observed in the stable population period between 1996-97 and 2000-01 with those from the period of population growth that began in 2001-02. In the earlier period, the rates for students entering 2nd through 8th grade varied around an average of about 0.99 to 1.00. Some rates were as high as 1.02, while some were as low as 0.97. In the more recent period, GPRs for students entering 2nd through 8th grade have been in the range of 1.01 to 1.07, indicating that the District has been gaining more than three percent in enrollment each year due to more families with children moving in than out. In fact, growth due to migration has been greater than

overall K-12 growth rates. In both periods, average gains at 1st and 9th grade exceeded the gains at other grades, indicating that some residents are opting into the public school system at those grade levels.⁶

Table 9 Average Grade Progression Rates* North Marion S.D., 1996-97 to 2006-07		
Grade Transition	1996-97 to 2000-01	2000-01 to 2006-07
K-1	1.09	1.11
1-2	0.99	1.05
2-3	0.97	1.03
3-4	1.02	1.01
4-5	0.97	1.07
5-6	1.02	1.03
6-7	0.99	1.04
7-8	1.00	1.01
8-9	1.03	1.06
9-10	0.97	0.99
10-11	0.92	0.98
11-12	0.92	0.94

**Ratio of enrollment in an individual grade to enrollment in the previous grade the previous year. The figures are averages for each period.*

Private and Home School Enrollment and District “Capture Rate”

The Oregon Department of Education’s (ODE’s) most recent list of private schools does not list any private schools within the NMSD boundaries. Private K-8 schools operate nearby in Wilsonville and Woodburn, according to ODE, but the nearest private schools offering high school grades are small non-denominational Christian schools in Brooks, Molalla, and Oregon City, each more than 10 miles outside the NMSD boundary.

In addition to public and private schools, the other option is home schooling. Home schooled students living in the District are required to register with the Willamette Educational Service District (WESD), though the statistics kept by the WESD are not

⁶Enrollment counts used in this study are from Fall, around October 1. Students who enroll in kindergarten after this date also contribute to the increases between kindergarten and first grade, since they are not included in the official October kindergarten enrollment.

precise because students who move out of the area are not required to drop their registration. Students who enroll in public schools after being registered as home schooled are dropped from the home school registry. Currently (Fall 2006) there are 74 NMSD residents registered, including 40 high school age children and 34 younger children. The current number of registered home school students represents a little over two percent of the NMSD's total K-8 residents, and about six percent of its high school age residents.

Comparing the population counted in the decennial censuses with the NMSD enrollment by grade level suggests that a very high percentage of area children enroll in NMSD schools. In school years corresponding to both the 1990 and 2000 censuses, the ratio of NMSD kindergarten enrollment to kindergarten-age children counted in the census was about 0.90, and the ratio of NMSD first grade students to the corresponding census count was about 0.95. Factors such as inter-district transfer students and census count irregularities may affect these ratios, but they are the best benchmarks for developing what we call "capture rates," an important link between the overall population in a school district and its public school enrollment.

HOUSING DEVELOPMENT AND STUDENT GENERATION

For school districts experiencing significant housing growth, understanding the existing demographics of the district is not enough. A common concern is the impact of new residential development on school enrollment. Without a detailed analysis, community members and school officials are often unsure about the impact. Residential developments generally contribute enrollment growth to local schools, but the average number of students in each home is often lower than many people anticipate, and demographic trends in existing homes may either offset or exacerbate the enrollment gains from new housing. Also, the impacts vary by the characteristics of the new housing. In this section, we present estimates of student generation by jurisdiction for new (built since 2000) and existing (built before 2000) housing in the NMSD. These estimates help to inform the enrollment forecasts, and they can be used by District staff on an *ad hoc* basis to estimate potential student generation from future developments as they are proposed or approved.

We estimated the Fall 2006 number of students per unit with a geographic information system (GIS), combining tax lots from Marion County (polygons) with NMSD student residences (points) and the city and Marion County comprehensive plan boundaries. Points for student residences were created by matching the student addresses to the tax lot addresses. This method successfully matched 87 percent of the District's students, and resulted in the most accurate geographic representation. Nearly all of the remaining students were matched by street address range, and may or may not be associated with the correct tax lot. A handful of addresses were outside of Marion County. Among those within the county, only about one percent of student addresses could not be matched in the GIS. We found that nearly all students in new subdivisions were associated with the correct lot, since the address information in the tax assessor's data is most accurate in the newest developments. In all cases, the student records used in this study contain no personally identifiable data such as names or birth dates, and the confidential locations of

student residences are reported only in summary form, such as in the tables in this section.

Information from the tax assessor's records is associated with the tax lot polygons. In this analysis we used the "property class" and "stat class" information to determine whether each tax lot included housing, and the number of housing units on each lot. Information from additional sources was required to determine the number of units in mobile home parks and a few small multiple family properties. The tax assessor's information also identifies the year that properties were built. We limited the analysis to homes built in the year 2005 and before, because some of the units built in 2006 may not have been completed and occupied in time for the 2006-07 school year. Also, relatively few of the units built in 2006 had been included in the tax lot shape file at the time that we acquired the data in November, 2006.

A summary of the results by jurisdiction is shown in Table 10. For the District overall in Fall 2006, the average number of K-12 students per housing unit was 0.507, just over one student for every two homes. The figure is similar to K-12 public school students per unit in neighboring districts calculated from 2000 Census tabulations. Student generation

<p>Table 10 Average Number of NMSD Students per Housing Unit, Fall 2006 By Jurisdiction</p>					
Jurisdiction	Grade Level				
	K-2	3-5	6-8	9-12	K-12
District Total	0.113	0.124	0.119	0.151	0.507
City of Aurora	0.103	0.109	0.087	0.096	0.395
City of Donald	0.106	0.112	0.125	0.168	0.511
City of Hubbard	0.184	0.209	0.166	0.210	0.769
Unincorporated Area Total	0.084	0.091	0.102	0.132	0.413
<i>Rural subdivisions¹</i>	<i>0.096</i>	<i>0.114</i>	<i>0.116</i>	<i>0.142</i>	<i>0.468</i>
<i>Other unincorporated²</i>	<i>0.076</i>	<i>0.073</i>	<i>0.092</i>	<i>0.124</i>	<i>0.364</i>

1. Homes on land designated in Marion County comprehensive plan as "Rural Residential."
2. Homes on all other land; most are designated as "Primary Agriculture."

Source: Data compiled by PSU-PRC, using geographic shape files and attribute data from Marion County, Dept. of Information Technology, GIS Division, November 2006. Housing unit counts were determined by PSU-PRC using the "property class" and "stat class" fields in the tax lot attribute data.

rates based on the 2000 Census were 0.495 in Canby, 0.529 in St. Paul, 0.472 in Molalla River, and 0.546 in Woodburn. The NMSD rate of 0.449 in 2000 is questionable, because the census estimated about 250 fewer public school students living within NMSD than the actual 1999-2000 enrollment. The school enrollment questions are on the long form, and results are subject to sampling error for areas with small populations. Most of the other 2000 Census data used in this study are from the short form that is sent to all households.

Table 10 identifies significant differences by jurisdiction in the average number of students per housing unit. The lowest generation rates are for “other unincorporated” and the City of Aurora. All but a few of the students in “other unincorporated” live on land designated as “Primary Agriculture.” The City of Donald and the category of “rural subdivisions” have student generation rates similar to the District overall, and the City of Hubbard has the highest rates. “Rural subdivisions” include land designated by Marion County as “rural residential.” Examples are the historic settlement of Butteville, and the 1970s Deer Creek Estates development near the Aurora Airport.

District-wide, the average number of NMSD K-12 students per housing unit for recently constructed housing is similar to the average for older housing. Like overall rates, the rates for new housing differ by jurisdiction. Table 11 on the next page compares the student generation from homes built between 2000 and 2005 with those built before 2000 by jurisdiction, and Chart 4 illustrates the same information. Overall K-12 rates for older and newer homes are generally comparable within each jurisdiction. For example, Aurora’s rates are close to 0.4 for both older and newer housing, and Hubbard’s rates are above 0.7. Newer homes in the unincorporated area have a higher average than older homes, but there are only 38 newer homes included in the analysis. In Donald, homes built since 2000 had a lower student generation rate than the older homes.

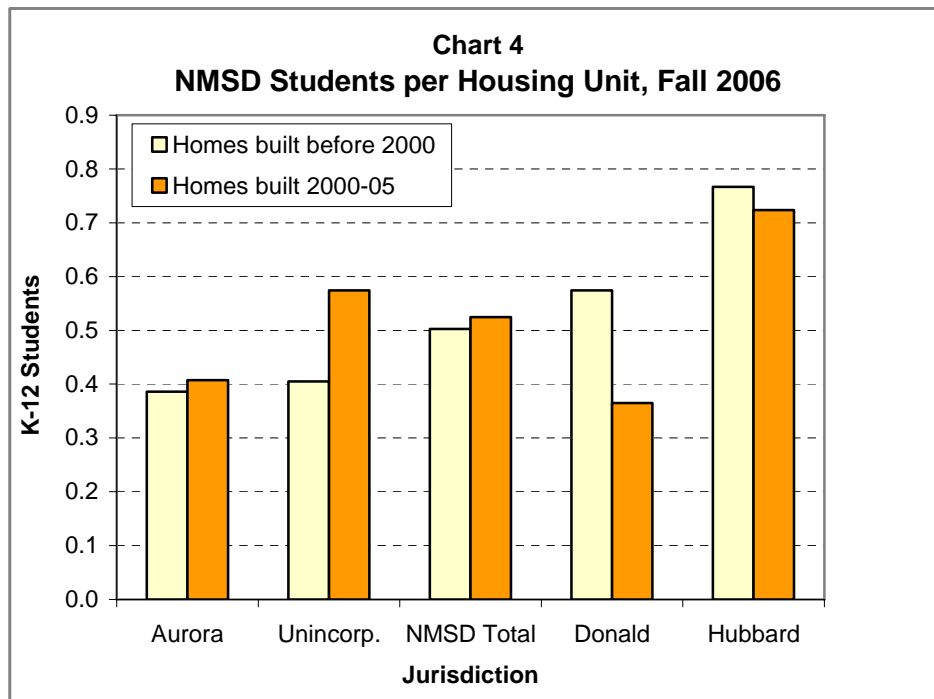
Table 11 includes student generation by grade level for homes built since 2000. Anecdotal evidence often suggests that younger families with preschool or elementary children buy new tract homes, so elementary enrollment peaks a few years after the homes are occupied, followed by secondary enrollment peaking several years later.

Table 11
Average Number of NMSD Students per Housing Unit, Fall 2006
Homes Built Before and Since 2000 by Jurisdiction

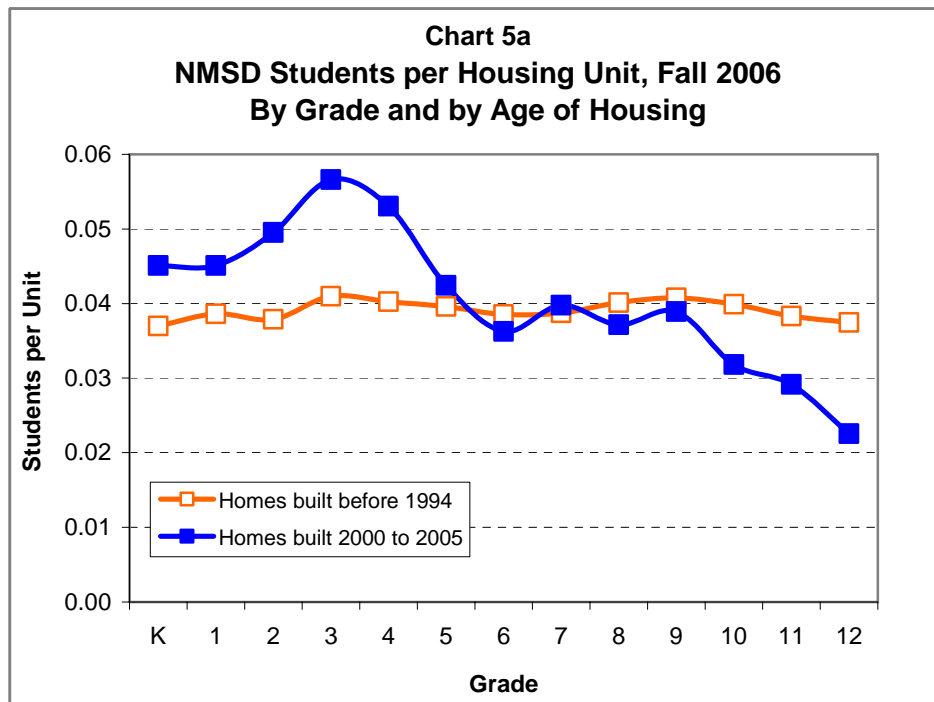
Jurisdiction	Grade Level				
	K-2	3-5	6-8	9-12	K-12
Homes built before 2000 -- NMSD	0.110	0.120	0.118	0.154	0.503
City of Aurora					0.386
City of Donald					0.574
City of Hubbard					0.767
Unincorporated Area					0.405
Homes built 2000 to 2005 -- NMSD	0.131	0.156	0.120	0.117	0.525
City of Aurora					0.407
City of Donald					0.365
City of Hubbard					0.724
Unincorporated Area					0.574

Note: Rates by grade level groups are not shown by jurisdiction because the number of units built between 2000 and 2005 is not sufficient to produce reliable estimates by grade level.

Source: Data compiled by PSU-PRC, using geographic shape files and attribute data from Marion County, Dept. of Information Technology, GIS Division, November 2006. Housing unit counts were determined by PSU-PRC using the "property class" and "stat class" fields in the tax lot attribute data.

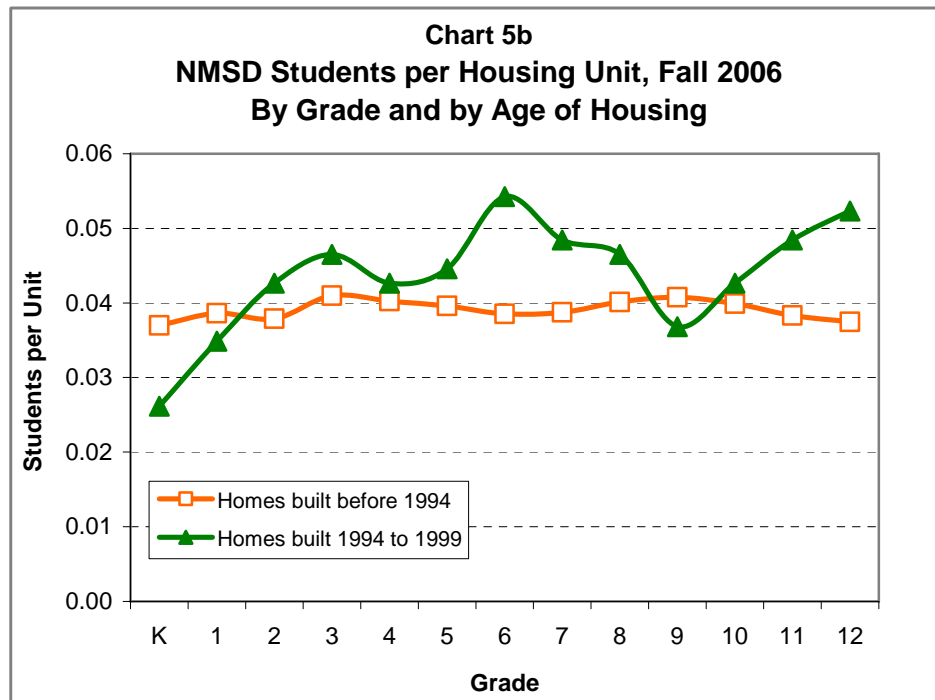


Our analysis for the 377 homes built in NMSD between 2000 and 2005 confirms the skewed age distribution of children in new homes. The grade level averages shown in Table 11 are higher for new homes than for older homes for K-2 and 3-5 grade levels, similar to older housing for grades 6-8, and lower for grades 9-12. To represent this result graphically in Chart 5a, we calculated rates for individual grade levels, applying a three year moving average to smooth the individual fluctuations. For example, the rates shown for 2nd grade are the average rates for 1st, 2nd, and 3rd grades. Student generation rates are evenly distributed for housing built before 1994, with each grade enrolling about 0.04 students per home (one student for every 25 homes). For housing built since 2000, the highest Fall 2006 rates were for grades K-4 and the lowest rates were for high school grades.



If homes have more elementary residents within a few years after they are built, it follows that they might house more secondary students several years later. To test this theory, we identified 172 homes built during the previous six year period, 1994 to 1999, and found that the number of residents by grade level in Fall, 2006 was indeed skewed toward the secondary grades.⁷ For housing built in the 1994 to 1999 period, the largest numbers of

NMSD students in Fall 2006 were generally in grades 6-12. The average number of students by grade residing in housing built between 1994 and 1999 is compared with student generation from pre-1994 housing in Chart 5b.



In the Appendix, tables A1 and A2 in formats similar to Tables 10 and 11 show the numbers of NMSD students by jurisdiction. These are the figures used to calculate the student generation rates. Table A2 shows that 198 NMSD Fall 2006 students resided in housing built during the six year period from 2000 to 2005. NMSD enrollment grew by 270 students in the past six years, from 1,670 in 2000-01 to 1,940 in 2006-07. We can't claim that housing construction contributed precisely 198 new students to NMSD, but the figures show that the significant population growth related to new housing development has been the largest factor influencing the District's growth. Demographic change and perhaps a small amount of population growth in the pre-2000 housing stock has also contributed somewhat to the enrollment growth.

⁷Homes in two manufactured home parks built between 1994 and 1999 were excluded from the analysis, for comparability to the 2000 to 2005 period, which did not include any manufactured home parks.

ENROLLMENT FORECASTS

District-wide Population Forecast

A demographic cohort-component model was used to forecast population for the District by age and sex. The components of population change are births, deaths, and migration (residential relocation). Using age-specific fertility rates, age-sex specific mortality rates, age-sex specific migration rates, estimates of recent net migration levels, and forecasts of future migration levels, each component is applied to the base year population in a manner that simulates the actual dynamics of population change.

Some of the findings described in the earlier section “Population and Housing Trends” inform the assumptions used in the population forecast for the 2000 to 2020 period. In particular, the migration levels experienced during the 2000s characterize a period of relatively high growth associated with the construction of as many as 60 to 100 housing units annually. The slower growth in the 1990s relates to a period when net migration was close to zero, population grew slightly because of births, and an average of only 25 net housing units were added annually. Because of the cyclical nature of housing markets and the constrained land supply, the recent period is seen as an upper bound for the District’s long term growth, while the 1990s are seen as a lower bound.

We also consulted external population and employment forecasts published by state and local agencies:

- The Oregon Office of Economic Analysis forecasts that Marion County’s population will grow by 29 percent (1.3 percent annually) between 2000 and 2020, from 284,838 in 2000 to 367,018 in 2020.⁸

⁸“Forecasts of Oregon’s County Populations and Components of Change, 2000 to 2040.” Oregon Department of Administrative Services, Office of Economic Analysis, April, 2004.

- In the Marion County Comprehensive Plan, the 2020 population forecast for the City of Woodburn is 34,919.⁹ Comparing the forecast with the 2000 Census population of 20,100 implies a 20 year growth rate of 74 percent (2.8 percent annually). Woodburn's city limits currently reach the edge of the NMSD boundary, so its long range expansion may contribute growth to the NMSD.
- A draft population forecast produced for the City of Hubbard is 3,619 for 2015, implying a 15 year growth rate of 46 percent (2.2 percent annually).
- The Oregon Employment Department forecasts that employment in the region is forecast to grow by 16 percent in a ten year period (1.5 percent annually).¹⁰

Our forecast for 2020 population in the NMSD is 11,914, an increase of 3,312 persons from the 2000 Census (1.6 percent average annual growth). The District-wide population forecast by age group is presented in Table 12 on the next page. Total population is forecast to grow by 38 percent between 2000 and 2020. School-age population ages 5 to 17 is expected to increase by 750 persons, or 41 percent.

In contrast to the 1990 to 2000 period, the 2000 to 2010 and 2010 to 2020 forecasts indicate growth in population age 20 to 34. The rural and small town environment and lack of multi-family housing will limit the number of young adults somewhat, but the overall state and national population in these age groups will increase as the "baby bust" generation is replaced by the "echo boomers" and the children of immigrants. Continued housing growth in the District will also contribute to the growth, particularly if the tract homes within new subdivisions remain more affordable than homes closer to Portland. The increase in young adults causes the number of births to increase, so the child population grows significantly over the forecast period.

⁹"Marion County Comprehensive Plan, Population Coordination Project." Marion County Ordinance No. 1091, adopted October 21, 1998, updated by Ordinance No. 1201, adopted November 10, 2004. Available at <http://www.co.marion.or.us/PW/Planning/population.htm>

¹⁰"Employment Projections by Industry, 2004-2014." Oregon Employment Department, Workforce Analysis, July, 2005. Combined employment in the Marion/Polk/Yamhill and Clackamas regions was 303,570 in 2004 and 350,950 in the 2014 forecast.

Table 12
Population by Age Group: *MIDDLE* Series Forecast
North Marion School District, 1990 to 2020

	1990 Census	2000 Census	2010 Forecast	2020 Forecast	2000 to 2020 Change	
					Number	Percent
Under Age 5	610	585	799	978	393	67%
Age 5 to 9	635	681	861	1,000	319	47%
Age 10 to 14	584	730	845	1,019	289	40%
Age 15 to 17	362	434	501	576	142	33%
Age 18 to 19	184	227	328	369	142	63%
Age 20 to 24	499	434	582	706	272	63%
Age 25 to 29	587	545	650	837	292	54%
Age 30 to 34	655	574	609	769	195	34%
Age 35 to 39	614	663	658	764	101	15%
Age 40 to 44	568	711	671	688	-23	-3%
Age 45 to 49	511	642	719	695	53	8%
Age 50 to 54	452	603	739	695	92	15%
Age 55 to 59	378	477	613	688	211	44%
Age 60 to 64	360	358	538	663	305	85%
Age 65 to 69	342	298	402	519	221	74%
Age 70 to 74	295	243	277	420	177	73%
Age 75 to 79	196	196	199	272	76	39%
Age 80 to 84	124	121	126	147	26	21%
Age 85 and over	77	80	99	109	29	36%
Total Population	8,033	8,602	10,216	11,914	3,312	38%
Total age 5 to 17	1,581	1,845	2,207	2,595	750	41%
share age 5 to 17	19.7%	21.4%	21.6%	21.8%		

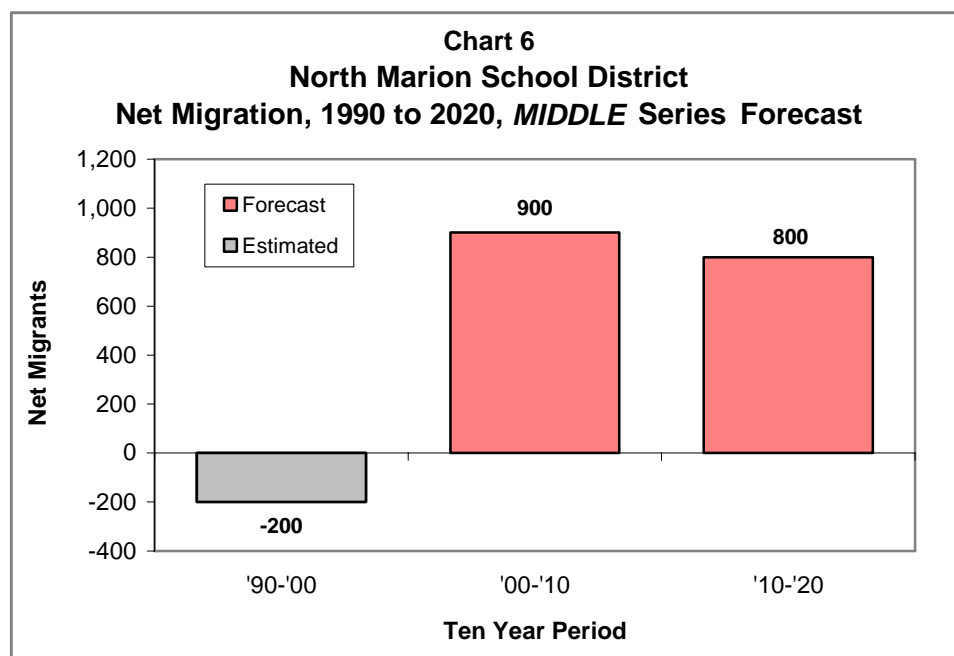
		1990-2000	2000-2010	2010-2020
Population Change		569	1,614	1,698
Percent		7.1%	18.8%	16.6%
Average Annual		0.7%	1.7%	1.5%

Source: U.S. Census Bureau, 1990 and 2000 Censuses; data aggregated to NMSD boundary by Portland State University Population Research Center. PSU-PRC Forecasts, 2010 and 2020.

This forecast is characterized as a “middle series” forecast because it represents the most likely scenario for future growth. We assume that the current subdivisions are developed by 2008, after which housing growth slows significantly for a few years, and then resumes to its recent level for the balance of the forecast, from about 2011 to 2020. The middle series forecast falls between the “low series,” in which housing growth is constrained in the long run, and the “high series,” in which there are no constraints to housing growth. In the high series forecast, development continues at its recent level throughout the 10 year horizon. The low and high series population forecasts are included in the Appendix as tables A3 and A4.

Because all of the District's students currently attend the same series of schools, no attempt has been made to predict the extent of future growth by geographic area within the District. The potential growth scenarios include boundary expansions in any or all of the District's three cities, northward expansion of Woodburn, multi-family infill, or development of some of the 25 or more Measure 37 claims that have been filed with Marion County. Among the claims, 10 include a specific number of housing units. These 10 claims cover 121 acres, and propose a total of 27 housing units. Another 15 claims, covering 496 acres, include language like "subdivide and place dwellings" but do not specify the number of dwellings.

Assumptions about the level of future migration are a major component of the population forecasts, and impact the enrollment forecasts. Forecasts of migration are guided by the estimates of past migration, as well as expectations of housing growth. The overall population increase attributable to net migration in the mid-range forecast is shown in Chart 6 below. In the forecast period net migration accounts for about half of overall population growth, with natural increase (births minus deaths) accounting for the balance. Similar charts for the low and high series forecasts are included in the Appendix as Chart A1 and Chart A2.



District-wide Enrollment Forecast

Historic school enrollment is linked to the population forecast in two ways. First, the kindergarten and first grade enrollments at the time of the most recent census (the 1999-2000 school year) are compared to the population at the appropriate ages counted in the census. The “capture rate,” or ratio of enrollment to population, is an estimate of the share of area children who are enrolled in NMSD schools. Assumptions for capture rates based on census data are used to bring new kindergarten and first grade students into the District’s enrollment. If there is evidence that capture rates have changed since the time of the census, they may be adjusted in the forecast. The 1999-2000 rates, 0.90 for Kindergarten and 0.95 for first grade, are used throughout the forecast.

The other way that historic population and enrollment are linked is through migration. Annual changes in school enrollment by cohort closely follow trends in the net migration of children in the District’s population. The way that migration is integrated in the forecast is described below.

Once the students are in first grade, a set of baseline grade progression rates (GPRs) are used to move students from one grade to the next. These baseline GPRs, usually 1.00 for elementary grades, represent a scenario under which there is no change due to migration. Enrollment change beyond the baseline is added (or subtracted, if appropriate) at each grade level depending on the migration levels of the overall population by single years of age. Table 13 shows the average GPRs for the most recent ten years of observed historic enrollment (1996-97 to 2006-07), the baseline GPRs used in the model, and the average GPRs calculated from the enrollment forecasts between 2006-07 and 2016-17.

The base year data for the population forecast is 1990 Census data. From the 1990 base, the model is calibrated to actual change using 2000 Census results and annual school enrollment data beginning with the earliest year available (1989-90) and extending to the most recent year (2006-07). Forecast births in this historic period are calibrated to actual births that occurred within the District, and net migration levels are calibrated to the net migration that was estimated between the 1990 and 2000 censuses.

Table 13
Grade Progression Rates¹
North Marion School District

Grade Transition	Historic Average: 1996-97 to 2006-07	Baseline (without the influence of migration)	Forecast Average: 2006-07 to 2016-17
K-1	1.102	-- ²	1.085
1-2	1.029	1.000	1.027
2-3	1.005	1.000	1.024
3-4	1.013	1.000	1.029
4-5	1.026	1.000	1.027
5-6	1.029	1.000	1.021
6-7	1.020	1.000	1.008
7-8	1.004	0.990	0.992
8-9	1.050	1.040	1.043
9-10	0.982	0.970	0.976
10-11	0.957	0.960	0.968
11-12	0.931	0.940	0.931

1. Ratio of enrollment in an individual grade to enrollment in the previous grade the previous year.

2. The enrollment forecast model uses capture rates for first grade; K-1 baseline GPRs are not used.

Table 14 on the next page contains grade level forecasts for the North Marion School District for each year from 2007-08 to 2016-17. The forecasts are also summarized by grade level groups (K-2, 3-5, 6-8, and 9-12). Overall K-12 enrollment is forecast to increase throughout the period, with annual growth ranging from 15 to 20 students in the slowest growth years (2008-09 to 2011-12) to about 40 students annually in the fastest growth years (2007-08 and the period between 2012-13 and 2016-17).

All grade level groups grow over the mid-range (5 year) and long-range (10 year) forecast, but high school grades grow relatively slowly. That is because high school grades currently have as many or more students as lower grades, and migration adds fewer teenagers than younger children to the area's population.

In the earliest years of the forecast, primary grades are expected to experience the strongest growth, influenced by the current wave of housing construction and the recent

Table 14
North Marion School District, *MIDDLE* Series Enrollment Forecasts, 2007-08 to 2016-17

Actual		Forecast									
Grade	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
K	157	140	151	157	155	154	156	155	159	164	170
1	115	169	151	155	167	164	166	168	167	174	179
2	152	122	172	154	157	169	168	170	172	173	181
3	160	159	124	175	156	159	172	171	173	177	178
4	163	169	162	126	177	158	163	177	176	180	185
5	141	172	172	165	128	179	162	167	182	183	187
6	145	147	174	174	167	129	183	165	171	188	189
7	154	148	148	175	175	168	130	184	166	173	190
8	156	155	147	147	173	173	166	129	182	164	171
9	160	165	162	154	153	180	180	173	134	189	171
10	156	157	161	158	150	149	175	175	169	131	185
11	136	152	151	155	152	145	144	169	169	164	127
12	145	126	142	141	145	142	135	134	157	157	151
Total	1,940	1,981	2,017	2,036	2,055	2,069	2,100	2,137	2,177	2,217	2,264
K-2	424	431	474	466	479	487	490	493	498	511	530
3-5	464	500	458	466	461	496	497	515	531	540	550
6-8	455	450	469	496	515	470	479	478	519	525	550
9-12	597	600	616	608	600	616	634	651	629	641	634

	5 Year Growth: 2006-07 to 2011-12		5 Year Growth: 2011-12 to 2016-17		10 Year Growth: 2006-07 to 2016-17	
	Change	Pct.	Change	Pct.	Change	Pct.
K-2	63	13%	43	9%	106	25%
3-5	32	7%	54	11%	86	19%
6-8	15	3%	80	17%	95	21%
9-12	19	3%	18	3%	37	6%
Total	129	6%	195	9%	324	17%

Population Research Center, Portland State University, January 2007

increase in the number of births within the District. Enrollment in grades 3-5 begins its major growth after 2010-11, while middle school enrollment is expected to grow the most in the last few years of the forecast, between 2013-14 and 2016-17.

CONCLUSION

By exploring recent population, housing, and enrollment trends in the North Marion School District, linking population and enrollment forecasts in the demographic model, and producing district-wide enrollment forecasts by grade level, we have completed a study that we believe will be useful for a variety of long-range planning needs of the District.

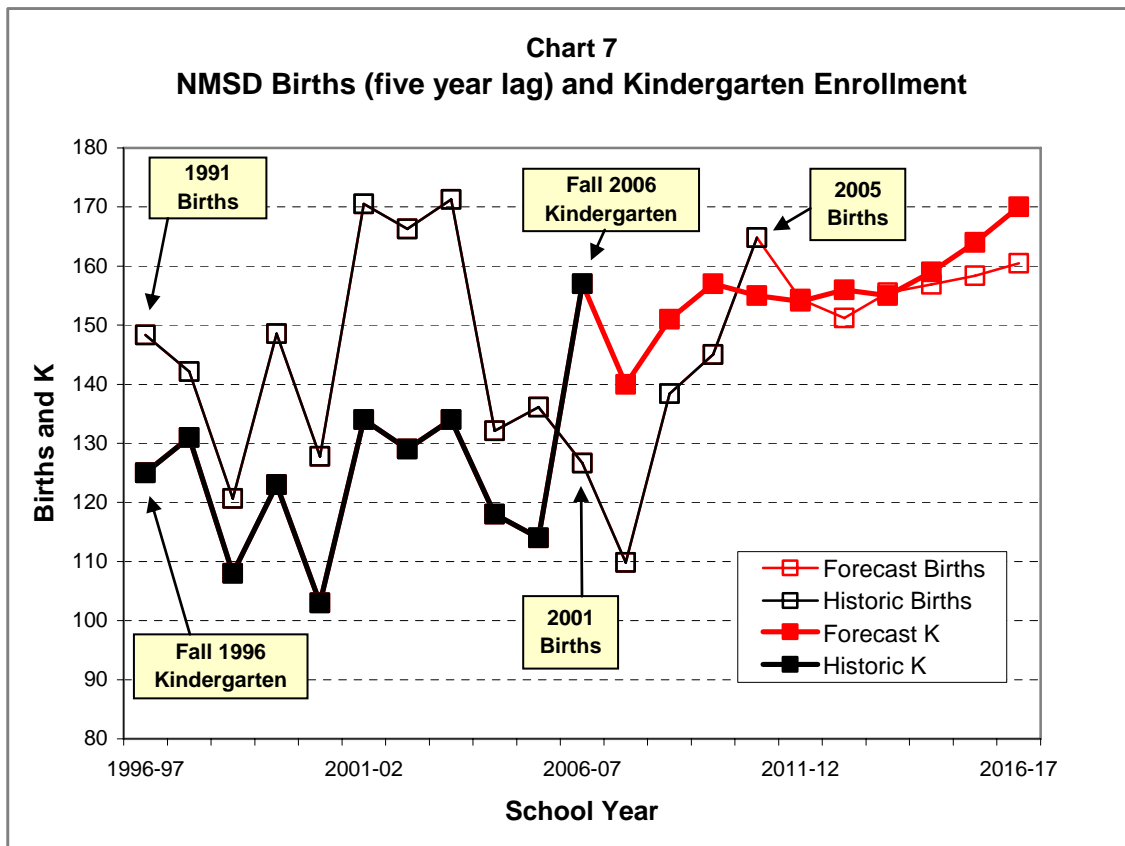
Overall K-12 enrollment is expected to continue to grow significantly, by 321 students in the next 10 years. The average annual growth in the forecast is less than in the 2000-01 to 2006-07 period, when the District added 270 students in six years. This is because, in our judgment, it is unlikely for housing growth to continue at the current pace throughout the next 10 years. There are always cycles, which are difficult to predict.

We caution the users of this report on the nature of forecasting in general. Fertility and mortality rates are relatively stable, but migration can vary greatly in an uncertain future. The migration assumptions involve judgment and the expectation that future trends will fall neatly into place in alignment with current trends and external forecasts produced by other agencies. We know from past history that unforeseen events can affect these expectations.

Another uncertainty in the forecast involves the entry grades, kindergarten and 1st grade. The relationship between births and subsequent kindergarten and 1st grade enrollment five to six years later is affected by two factors — the migration of children during the years prior to enrolling in school, and the capture rate. The current kindergarten enrollment of 157 is the highest in the 18 years of historic data that we analyzed. On the other hand, the current first grade enrollment of 115 is the lowest in the 18 year period. They both are likely outliers, making it difficult to identify a trend from the data. If there are sustained increases in kindergarten and 1st grade, they will influence District enrollment totals for years to come, since students have 13 years to progress through the system. Conversely, if kindergarten and 1st grade enrollments do not attain the relatively

high levels that we expect in the forecast, overall K-12 enrollments will be lower than forecast.

Chart 7 compares the historic and forecast number of births in the District with the historic and forecast kindergarten classes. This year is the first in the 10 year period that kindergarten enrollment exceeds the number of births five years earlier. Kindergarten enrollment has generally been between 10 and 20 percent below the lagged births; this year it is 24 percent above. Part of the explanation is the recent housing growth, but an unusual age distribution also has something to do with it. How much of an outlier is this year's kindergarten? We forecast a smaller kindergarten in 2007-08, but it is still above the lagged births. If the kindergarten to lagged birth ratio were to return to its previous level, there would be 20 to 30 fewer kindergarten students each year in the forecast.



Most of the specific year-to-year enrollment change in the forecast is influenced by the size of individual classes progressing from grade to grade. We have observed that in recent years migration has contributed additional students at almost every grade level, particularly the lower grades. The forecast includes positive net migration of students, at similar rates to the past 10 years, which included four years of low population growth and six years of high population growth. There will be cycles of faster and slower economic and population growth in the future which no forecast will be able to predict, so the year-to-year pattern of actual growth will deviate from the forecast. However, the long-term enrollment changes are consistent with population, employment, and housing growth expected in the region.

Because of the uncertainties of forecasts described in this section, it is important to monitor the results and update the forecast as needed. In general, forecast error varies according to the size of the population being forecast and the length of the forecast horizon. The smaller the population and the longer the forecast period, the larger the error is likely to be. The North Marion School District currently has a population approaching 10,000, but is economically interdependent with the greater region of nearly 2.5 million people in the Portland and Salem areas.

Finally, long range forecasts should be used as only one of many tools in the school planning process. Even if this forecast is highly accurate in the first few years, it is advisable to update the forecast as new information becomes available. New information may be school enrollment data, new census data, proposals for major new housing development, or land use changes that may result in housing or economic growth that differs significantly from recent and current trends.

APPENDIX

STUDENTS BY JURISDICTION AND AGE OF HOUSING

LOW AND HIGH SERIES ALTERNATE FORECASTS

Table A1
NMSD Students by Jurisdiction, Fall 2006

Place of Residence	Grade Level				
	K-2	3-5	6-8	9-12	K-12
City of Aurora	37	39	31	34	141
City of Donald	36	38	42	57	173
City of Hubbard	168	192	152	193	705
Unincorporated Area Total	171	184	208	268	831
<i>Rural subdivisions¹</i>	83	99	101	123	406
<i>Other unincorporated²</i>	88	85	107	145	425
District Resident Total	412	453	433	552	1850
Outside of NMSD	12	11	22	45	90
District Enrollment Total	424	464	455	597	1940

1. Homes on land designated in Marion County comprehensive plan as "Rural Residential."

2. Homes on all other land; most are designated as "Primary Agriculture."

Note: Minor adjustments to the raw data (1,961 student records in matched file) were made to replicate published enrollment totals (1,940 K-12 students).

Source: Student addresses matched to tax lots and streets by PSU-PRC, using geographic shape files and attribute data from Marion County, Dept. of Information Technology, GIS Division, November 2006.

Table A2
NMSD Students by Age of Housing, Fall 2006

Place of Residence	Grade Level				
	K-2	3-5	6-8	9-12	K-12
Homes built before 2000 -- NMSD	359	393	387	505	1643
<i>City of Aurora</i>					99
<i>City of Donald</i>					136
<i>City of Hubbard</i>					600
<i>Unincorporated Area</i>					808
Homes built 2000 to 2005 -- NMSD	49	59	45	44	198
<i>City of Aurora</i>					42
<i>City of Donald</i>					38
<i>City of Hubbard</i>					97
<i>Unincorporated Area</i>					22

Note: NMSD students residing outside of NMSD and students living in homes built in 2006 are not included in this table.

Note: Minor adjustments to the raw data (1,961 student records in matched file) were made to replicate published enrollment totals (1,940 K-12 students). The resulting estimates are not whole numbers, so the sum of students by grade level and by city may not equal the totals shown in this table.

Source: Data compiled by PSU-PRC, using geographic shape files and attribute data from Marion County, Dept. of Information Technology, GIS Division, November 2006. Housing unit counts were determined by PSU-PRC using the "property class" and "stat class

Table A3
Population by Age Group: *LOW* Series Forecast
North Marion School District, 1990 to 2020

	1990 Census	2000 Census	2010 Forecast	2020 Forecast	2000 to 2020 Change	
					Number	Percent
Under Age 5	610	585	767	784	199	34%
Age 5 to 9	635	681	839	832	151	22%
Age 10 to 14	584	730	858	862	132	18%
Age 15 to 17	362	434	514	514	80	19%
Age 18 to 19	184	227	343	354	127	56%
Age 20 to 24	499	434	582	603	169	39%
Age 25 to 29	587	545	650	715	170	31%
Age 30 to 34	655	574	609	670	96	17%
Age 35 to 39	614	663	658	734	71	11%
Age 40 to 44	568	711	671	662	-49	-7%
Age 45 to 49	511	642	719	688	46	7%
Age 50 to 54	452	603	739	720	117	19%
Age 55 to 59	378	477	613	671	194	41%
Age 60 to 64	360	358	538	583	225	63%
Age 65 to 69	342	298	402	483	185	62%
Age 70 to 74	295	243	277	364	121	50%
Age 75 to 79	196	196	199	230	34	17%
Age 80 to 84	124	121	126	114	-7	-6%
Age 85 and over	77	80	99	84	4	5%
Total Population	8,033	8,602	10,204	10,667	2,065	24%
Total age 5 to 17	1,581	1,845	2,211	2,208	363	20%
share age 5 to 17	19.7%	21.4%	21.7%	20.7%		

		1990-2000	2000-2010	2010-2020
Population Change		569	1,602	463
Percent		7.1%	18.6%	4.5%
Average Annual		0.7%	1.7%	0.4%

Source: U.S. Census Bureau, 1990 and 2000 Censuses; data aggregated to NMSD boundary by Portland State University Population Research Center. PSU-PRC Forecasts, 2010 and 2020.

Table A4
Population by Age Group: *HIGH* Series Forecast
North Marion School District, 1990 to 2020

	1990 Census	2000 Census	2010 Forecast	2020 Forecast	2000 to 2020 Change	
					Number	Percent
Under Age 5	610	585	830	1,077	492	84%
Age 5 to 9	635	681	917	1,066	385	57%
Age 10 to 14	584	730	914	1,093	363	50%
Age 15 to 17	362	434	525	664	230	53%
Age 18 to 19	184	227	330	435	208	92%
Age 20 to 24	499	434	619	774	340	78%
Age 25 to 29	587	545	704	884	339	62%
Age 30 to 34	655	574	621	837	263	46%
Age 35 to 39	614	663	682	849	186	28%
Age 40 to 44	568	711	690	719	8	1%
Age 45 to 49	511	642	733	738	96	15%
Age 50 to 54	452	603	761	734	131	22%
Age 55 to 59	378	477	609	717	240	50%
Age 60 to 64	360	358	560	677	319	89%
Age 65 to 69	342	298	412	513	215	72%
Age 70 to 74	295	243	279	432	189	78%
Age 75 to 79	196	196	199	275	79	40%
Age 80 to 84	124	121	122	146	25	21%
Age 85 and over	77	80	106	108	28	35%
Total Population	8,033	8,602	10,613	12,738	4,136	48%
Total age 5 to 17	1,581	1,845	2,356	2,823	978	53%
share age 5 to 17	19.7%	21.4%	22.2%	22.2%		

	1990-2000	2000-2010	2010-2020
Population Change	569	2,011	2,125
<i>Percent</i>	<i>7.1%</i>	<i>23.4%</i>	<i>20.0%</i>
<i>Average Annual</i>	<i>0.7%</i>	<i>2.1%</i>	<i>1.8%</i>

Source: U.S. Census Bureau, 1990 and 2000 Censuses; data aggregated to NMSD boundary by Portland State University Population Research Center. PSU-PRC Forecasts, 2010 and 2020.

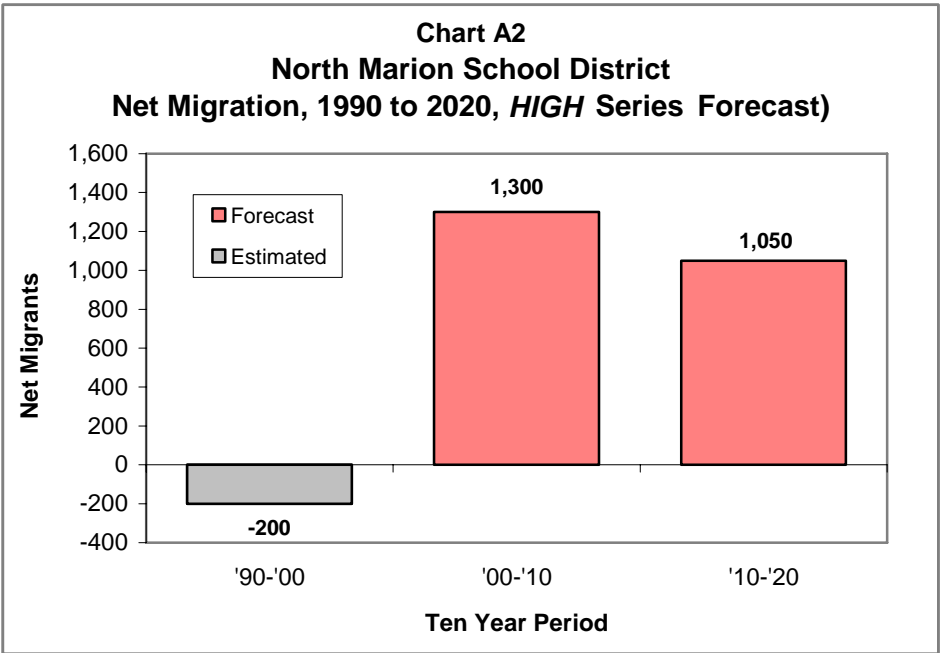
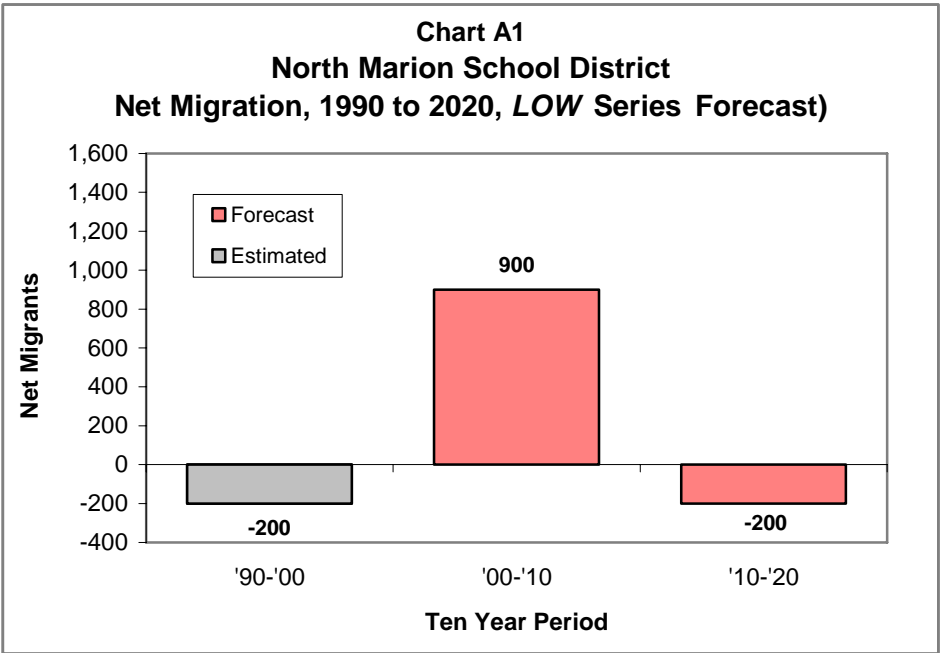


Chart A3
NMSD Alternate Enrollment Forecasts, 2007-08 to 2016-17

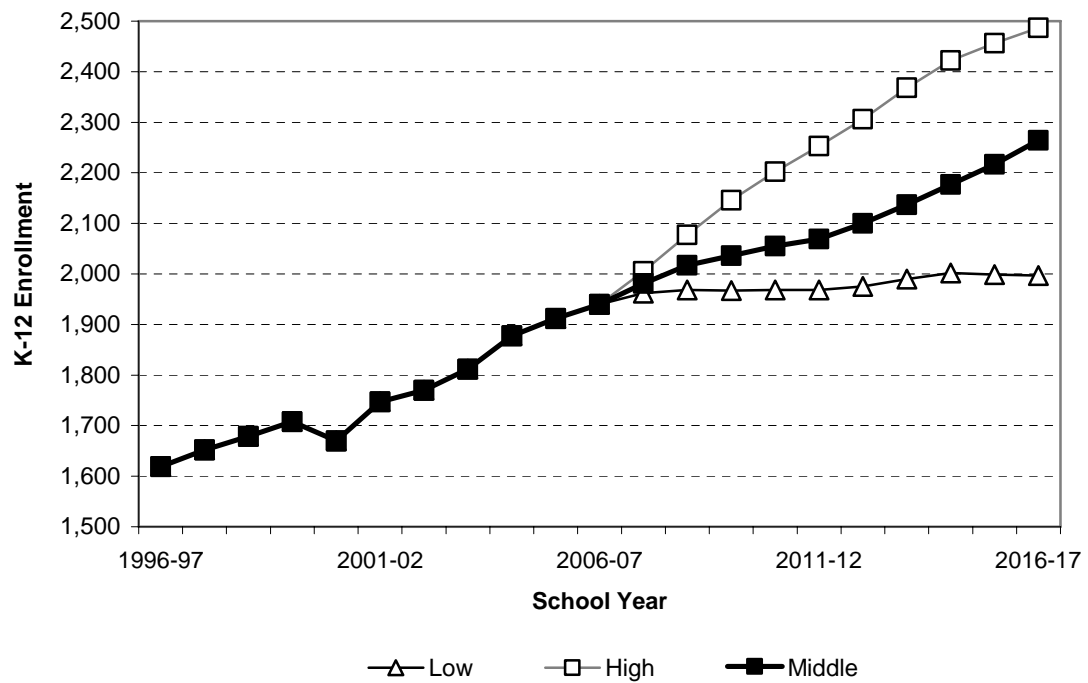


Table A5
North Marion School District, *LOW* Series Enrollment Forecasts, 2007-08 to 2016-17

Actual		Forecast									
Grade	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
K	157	143	140	149	146	144	143	142	144	145	145
1	115	164	151	147	157	154	152	152	150	153	154
2	152	119	164	151	148	158	156	154	154	152	155
3	160	157	119	164	151	148	159	157	155	155	153
4	163	166	157	119	165	152	150	161	159	157	157
5	141	169	166	157	120	166	154	152	163	161	159
6	145	145	169	166	158	121	168	156	154	165	163
7	154	147	145	169	167	158	122	169	157	155	166
8	156	154	145	144	167	165	156	121	167	155	153
9	160	164	160	151	150	174	172	162	126	174	161
10	156	157	159	155	147	146	170	168	158	123	170
11	136	151	151	153	149	142	141	164	162	153	119
12	145	126	142	142	143	140	132	132	153	151	142
Total	1,940	1,962	1,968	1,967	1,968	1,968	1,975	1,990	2,002	1,999	1,997
K-2	424	426	455	447	451	456	451	448	448	450	454
3-5	464	492	442	440	436	466	463	470	477	473	469
6-8	455	446	459	479	492	444	446	446	478	475	482
9-12	597	598	612	601	589	602	615	626	599	601	592

	5 Year Growth: 2006-07 to 2011-12		5 Year Growth: 2011-12 to 2016-17		10 Year Growth: 2006-07 to 2016-17	
	Change	Pct.	Change	Pct.	Change	Pct.
K-2	32	7%	-2	0%	30	7%
3-5	2	0%	3	1%	5	1%
6-8	-11	-2%	38	9%	27	6%
9-12	5	1%	-10	-2%	-5	-1%
Total	28	1%	29	1%	57	3%

Population Research Center, Portland State University, January 2007

Table A6
North Marion School District, *HIGH* Series Enrollment Forecasts, 2007-08 to 2016-17

Actual		Forecast									
Grade	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
K	157	142	148	165	165	163	164	164	167	170	175
1	115	172	158	164	180	180	178	179	179	183	186
2	152	123	180	165	168	185	185	183	184	184	188
3	160	161	128	187	169	172	189	189	187	188	188
4	163	172	169	134	193	174	177	195	195	193	194
5	141	176	181	178	139	200	180	183	202	202	200
6	145	150	184	189	184	144	206	186	189	209	209
7	154	149	154	188	193	187	147	210	189	193	213
8	156	155	149	154	188	193	187	147	210	189	193
9	160	165	163	156	162	197	203	196	154	221	198
10	156	159	163	161	154	159	194	200	193	152	218
11	136	155	156	160	158	151	156	190	196	189	149
12	145	126	144	145	149	148	140	146	177	183	176
Total	1,940	2,005	2,077	2,146	2,202	2,253	2,306	2,368	2,422	2,456	2,487
K-2	424	437	486	494	513	528	527	526	530	537	549
3-5	464	509	478	499	501	546	546	567	584	583	582
6-8	455	454	487	531	565	524	540	543	588	591	615
9-12	597	605	626	622	623	655	693	732	720	745	741

	5 Year Growth: 2006-07 to 2011-12		5 Year Growth: 2011-12 to 2016-17		10 Year Growth: 2006-07 to 2016-17	
	Change	Pct.	Change	Pct.	Change	Pct.
K-2	104	21%	21	4%	125	29%
3-5	82	17%	36	7%	118	25%
6-8	69	14%	91	17%	160	35%
9-12	58	9%	86	13%	144	24%
Total	313	15%	234	10%	547	28%

Population Research Center, Portland State University, January 2007